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USER'S GUIDE

**EtherLAN
SC & SC-T**

EtherLAN SC & SC-T Installation Manual

Table of Contents

Introduction

Thank you for buying a EtherLAN SC or EtherLAN SC-T. These products provide Ethernet connectivity by utilizing the SCSI (Small Computer System Interface) port of your Macintosh. The EtherLAN SC-T connects to Thick or Twisted-Pair Ethernet networks. The EtherLAN SC connects to Thin and Thick Ethernet networks. The EtherLAN SC and EtherLAN SC-T will enable your Macintosh to communicate with other Ethernet connected devices using EtherTalk or other Ethernet compatible protocols. Please note that within the context of this manual EtherLAN SC and EtherLAN SC-T will be referre d to collectively as "EtherLAN."

In sections where the products differ, they will be discussed separately in indented paragraphs.

The Apple EtherTalk driver provided with your EtherLAN allows your Macintosh to communicate at Ethernet speeds and to participate in any Ethernet service on the network, just as if you had an internal Ethernet board. In addition, your EtherLAN comes with the EtherLAN Setup program which provides important troubleshooting information and statistics on the EtherLAN and the Ethernet network.

This manual is designed to help you attach the EtherLAN to your Macintosh and connect it appropriately to an Ethernet network. It assumes you are familiar with basic Macintosh operations and conventions.

This manual is divided into several sections:

Quick Start

The Quick Start section provides abbreviated instructions on how to install the EtherLAN.

Getting Started

The Getting Started section describes the contents of the EtherLAN package and outlines the preparation and equipment you will need to install your EtherLAN on an Ethernet network.

Ethernet Overview

The Ethernet Overview provides an introduction to Ethernet and describes how the EtherLAN SC and the EtherLAN SC-T are integrated into your network. If you are already familiar with Thick, Thin and Twisted Pair Ethernet networks, you may want to skip this section.

Hardware Installation

The Hardware Installation section describes the Physical process of connecting the EtherLAN to the Macintos and Ethernet network.

Software Installation

The Software Installation section describes the software provided with your EtherLAN. The EtherLAN Setup program can test the integrity and can report valuable statistics regarding the EtherLAN's connection to the Macintosh and to
the network.

Troubleshooting Guide

These procedures give you additional assistance when installing the EtherLAN.

Appendices and Index

Configuration and technical specifications.

Please Read This Manual

This manual contains important information about your EtherLAN and about its use in Ethernet networks. Please read the manual thoroughly; it's worth a few minutes of your time. Promptly complete and mail the warranty registration card. This will ensure you will be informed of updates to your EtherLAN and future FOCUS Enhancements products.

Warranty and Service

The EtherLAN is covered by a three year limited warranty against manufacturing defects. Following this period, factory service is available. Refer to Appendix C for complete details.

If You Need Help With Your EtherLAN

If you have a question about your EtherLAN and cannot find the answer in this manual, call FOCUS Technical Support at (800) 647-7744 or (617) 938-8088. A Technical Support Representative will be happy to assist you with any questions.

Quick Start

If you are already familiar with installing Macintosh networks, SCSI hardware and system software, you can follow these abbreviated instructions. Otherwise, begin with the Getting Started section.

1. Connect your EtherLAN to the SCSI and Ethernet cables.

2. Start your Macintosh from your hard drive and then insert the EtherLAN disk.

3. Read the READ ME file (if present).

4. Run the Installer script to install the EtherTalk software.

5. Drag the EtherLAN Setup program from the disk to your hard disk. This is used to manage the device after it is installed.

6. Select the EtherTalk icon under Network in the Control Panel.

7. If you want to set up file sharing do this now. (Consult your Mac manual).

8. Restart your Macintosh from your hard disk.

Getting Started

Before connecting your EtherLAN, confirm that your EtherLAN package is complete. Your package should contain:

- One EtherLAN SC or EtherLAN SC-T and external power supply
- One EtherLAN SC/EtherLAN SC-T Manual
- One EtherLAN/EtherLAN SC-T Installation Disk

You will also need the following items to connect the EtherLAN to your Macintosh and to the Ethernet network.

System Software

System 6.0.3 and Finder 6.1 (or later versions) must be installed in the System Folder. EtherLAN SC/ SC-T work with System 7.

SCSI Hardware

An appropriate SCSI cable is required to connect your EtherLAN to your Macintosh. The EtherLAN has a 25-pin SCSI interface identical to the SCSI port of the Macintosh. If your connecting the EtherLAN directly to the back of the Macintosh, you will need a 25-pin to 25-pin cable. However, if your are connecting the EtherLAN to a hard disk with a 50-pin (Centronics) connector, you will need a 25-pin to 50-pin cable. Macintosh PowerBooks use an HDI SCSI cable. These cables are available from FOCUS Enhancements.

Please note that the EtherLAN's SCSI cable should not be over two feet in length.

Network Hardware

Thick Ethernet

For thick Ethernet installations, you will need a transceiver or MAU (Medium Attachment Unit) to connect the EtherLAN to the Ethernet backbone cable. A Transceiver cable is required to connect the EtherLAN to the transceiver unit. The EtherLAN SC and the EtherLAN SC-T are both equipped with a Thick Ethernet (AUI) interface.

Thin Ethernet

Because a Thin Ethernet transceiver is already built into the EtherLAN SC, an external transceiver is not required. The EtherLAN SC can attach to the Thin Ethernet with a simple BNC T-connector.

Twisted-Pair Ethernet

Because a Twisted-Pair Ethernet 10BaseT transceiver is already built into the EtherLAN SC-T, you can attach it to an RJ45 modular wall jack. The wall jack must be connected to a Twisted-Pair Ethernet hub such as the EtherLAN Hub/8, or you can attach directly to an EtherLAN Hub/8.

A thick Ethernet AUI connector is included on the EtherLAN SC and SC-T for connection to thicknet or to a transceiver.

Hardware items are generally available from your local computer dealer or directly from FOCUS Enhancements.

If you are installing a complete Ethernet network or are unfamiliar with the cabling terms described above, refer to the documentation supplied with the cable manufacturer's equipment or call FOCUS Technical Support.

Ethernet Overview

The following section is an introduction to the three standard media for Ethernet specified by the Institution of Electrical and Electronic Engineers (IEEE). Thick Ethernet (10Base5 or Standard Ethernet), Thin Ethernet (10Base2 or CheaperNet), and Twisted-Pair Ethernet (10BaseT or unshielded twisted pair (UTP) Ethernet).

The Ethernet Overview will familiarize you with the terminology and hardware used in the installation sections. It will also describe the function of the network software. If you are already familiar with Thick, Thin and Twisted-Pair Ethernet, you may wish to skip this sections and proceed directly to the Hardware Installation section. You may, however, want to refer this section if you have any questions regarding the terms used throughout this manual.

What is Ethernet?

Ethernet is a communication method for networking computers that was developed by Xerox Corporation. The system was coined "Ethernet" after the theoretical luminiferous ether through which electromagnetic radiation was once thought to propagate. Xerox, Digital Equipment Corporation and Intel drew up a standard for a 10 Megabit per second (10 Mb/s) Ethernet which is now known as the IEEE standard 802.3. Products that abide by the IEEE 802.3 Ethernet standards are usually compatible with each other.

In order to understand where Ethernet and the EtherLAN fit into the networking scheme, you need to look at the two main components:

- Network Protocol software
- Network Hardware

The EtherLAN is shipped with Apple Computer's EtherTalk protocol software. EtherTalk is the software designed by Apple that allows Apple computers to communicate with each other over Ethernet hardware. The EtherLAN Installer program places the Apple Ether Talk drivers into the System Folder of the Macintosh disk. You select the network driver by opening the Control Panel and specifying the appropriate driver with the Network Control Panel Device.

The hardware required in an Ethernet network varies depending on the type of cabling currently in use.

Thick Ethernet

Thick Ethernet or Standard Ethernet cable has a coaxial design that provides good signal quality. It is a bright yellow or orange cable approximately 1/2 inch in diameter and is specifically designed for Ethernet transmissions. This Ethernet cabling supports 10 Mb/s data over 500 meters of cable and is ideal for networks spanning between two buildings or for installations traversing several floors. The coaxial cable must have no more than two ends to the network. A 50 Ohm terminator is necessary to ensure that network signals do not reflect back onto the network at the ends and distort the signal. Terminators should be used only at the end points of a network.
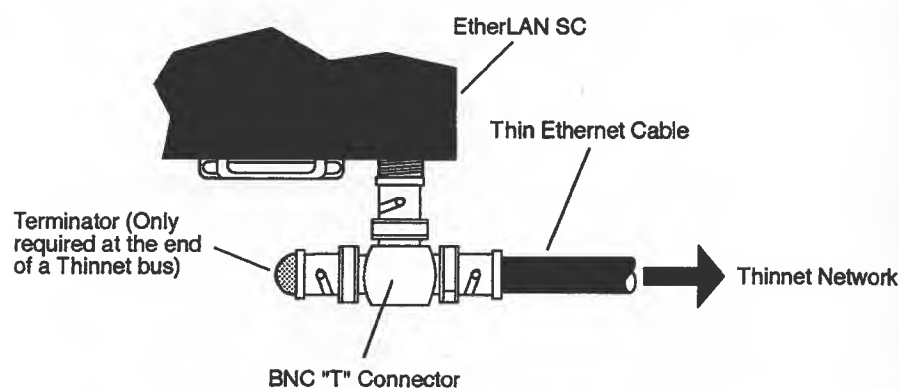
At each connection to the Thick Ethernet an Ethernet transceiver or Medium Access Unit (MAU) is required. A transceiver cable or Attachment Unit Interface (AUI) cable is required to connect the transceiver to the 15-pin connector of the EtherLAN.
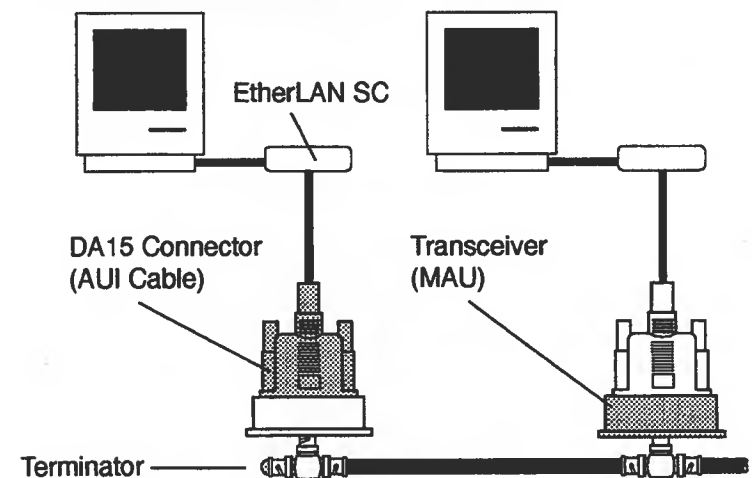
Thin Ethernet

Thin Ethernet, or CheaperNet, is frequently used because of its easy installation and reduced cabling cost. This coaxial cable is also known as RG-58, RG-58/U or RG-58 A/U cable. Thin Ethernet has diameter of approximately 1/4 inch an supports 10Mbs data rate over 185 meters. Like the Thick Ethernet, the Thin Ethernet coaxial cable must have 50 ohm terminators at both ends of the cable.

Because a Thin Ethernet device typically has a transceiver integrated into the unit, a Thin Ethernet installation is very simple, since transceivers and transceiver cables are not necessary. A BNC T-connector attaches directly to the Thin Ethernet interface of the EtherLAN SC.

EtherLAN SC
Thin Ethernet Cable
Terminator (Only required at the end of a Thinnet bus)
Thinnet Network
BNC "T" Connector

Twisted Pair Ethernet

Also known as 10BaseT, Twisted-Pair Ethernet is the newest of the three standards. Finalized in September 1990, Twisted-Pair Ethernet uses existing telephone wiring found in most commercial buildings. 10BaseT is an economical solution because wiring costs are reduced since additional cable is not required as in Thick or Thin Ethernet installations. It uses two pairs of wire in 8-pin modular connectors to connect each device to a repeater or hub port. The hub then transmits the message onto the other ports of the hub. There can only be a single device per hub port in any 10BaseT network.

Because a Twisted-Pair Ethernet device typically contains an integrated transceiver unit, Twisted-Pair is very simple to install; external transceivers and transceiver cables are not necessary. A 10BaseT patch cord (sometimes called an "RJ45" cable) connects the Twisted-Pair Ethernet interface of the EtherLAN SC-T to a wall jack or 10BaseT hub. For more detailed information on 10BaseT and Twisted-Pair Ethernet (including wiring diagrams), refer to Appendix B.

8-pin Modular RJ45 Connector (10BaseT)
EtherLAN SC-T
Unshielded Twisted Pair Wiring
To 10BaseT Network Hub
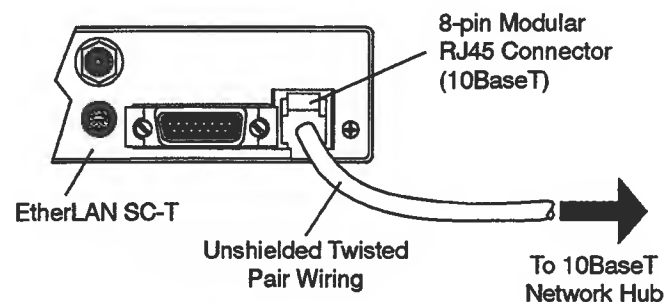
How Does the EtherLAN SC Use Ethernet?

The EtherLAN provides the Macintosh with a hardware interface to an Ethernet network. Ethernet allows a Macintosh to communicate with other computers such as a mainframe or Unix file server in their native Ethernet environment. A Macintosh can be joined to an Ethernet network by using a EtherLAN device.

Ethernet data is transmitted across the network in groups called Ethernet frames. When a Macintosh sends data across an Ethernet network, the AppleTalk data is encapsulated into Ethernet frames. This also applies to DECnet or TCP/IP data. Because protocol specific data is encapsulated into Ethernet frames, the network can have many different protocols running over it simultaneously.

The EtherTalk software provided with the EtherLAN is a driver which encapsulates and de-encapsulates Ethernet packets. The EtherLAN, however, is not shipped with communication software to connect to network hosts running specific network protocols such as TCP/IP. In order for the Macintosh to send and receive TCP/IP packets, you must install software that is TCP/IP compatible. NCSA Telnet is an

example of a software package which utilizes the TCP/IP protocols. Other examples of higher-level software include MacTCP for TCP/IP communications and PacerLink for DECnet communications.

How Does Ethernet Compare to LocalTalk?

The success of LocalTalk can be partially attributed to its low cost and simplicity of implementation and use. Every Macintosh has a built-in LocalTalk transceiver, making the task of networking these computer simple. A user needs only a minimal amount of hardware to connect the devices together. Unfortunately, the original communication method used by AppleTalk limits the rate of communication or the speed of the network traffic to 230.4 kilobits per second (230.4 kb/s).

In order to increase network communication speed, Apple adopted Ethernet as an alternative communication method. Because of it popularity with other vendors in networking microcomputers and mainframes, Ethernet seemed an obvious choice for Macintosh connectivity.

How Much Faster is Ethernet?

Ethernet can transmit at a raw data rate of 10 Mb/s compared to the LocalTalk data transmission rate of 230.4 kb/s. These figures would seem to indicate that Ethernet is approximately 40 times faster than LocalTalk. In actual use, however, the speed increase varies depending upon the amount of activity on the network and the type of software that is controlling that activity. Although your network speed will not increase by a factor of 40, in most operations you should see a network speed increase of between two and five times the speed of LocalTalk.

Ethernet is also advantageous in that it was designed as a high bandwidth medium for large networks and shows no performance degradation until several dozen nodes are communicating concurrently. With LocalTalk, however, as your network size increases you will notice a significant degradation in network performance. LocalTalk performance will degrade after a small increase in network size, frame 10 to 20 nodes, for example. For networks where size, speed and performance are important, Ethernet is an excellent solution.

Hardware Installation

NOTE: The hardware installation instructions assume that the Ethernet network is already established. (For more information on Ethernet, refer to the Ethernet Overview section.)

The following sections provide instructions to connect the EtherLAN to your Macintosh and to an Ethernet network. Consult your network administrator or a professional installer before adding any device, including the EtherLAN, to your network. Your installation will proceed more smoothly without disrupting other network users. Keep in mind that the EtherLAN installation is simple compared to a complete network installation. If you are installing a complete Ethernet network, FOCUS Enhancements recommends you contact a professional network consultant. You may also contact FOCUS Technical Support with specific questions regarding your network installation.

This section describes how to connect the EtherLAN to your Macintosh and link your computer to an existing Ethernet network. In summary, the steps for installation are:

1. Determine the type of Ethernet cable in use.

2. Verify the EtherLAN is configured for your type of Ethernet cable.

3. Connect the EtherLAN to the Macintosh SCSI port.

4. Connect the EtherLAN to the Ethernet network.

Determining the Network Cable Type

Before attempting to connect your Macintosh to the Ethernet network, you should have the appropriate cabling available. If you are installing a complete Ethernet network or are unfamiliar with how to create a connector or transceiver location for your Macintosh, refer to the documentation supplied with your network hardware.

Review the Ethernet Overview section and determine the type of Ethernet cable currently in use at your facility.

Verifying the EtherLAN Configuration

Before connecting the EtherLAN to the network, make sure the EtherLAN is configured correctly for your network cable type. The EtherLAN SC can be configured for either Thick or Thin Ethernet while the EtherLAN SC-T can be configured for either Thick or Twisted-Pair Ethernet. The EtherLAN is configured by moving a jumper pack to the appropriate socket on the EtherLAN board.

EtherLAN SC

The EtherLAN SC is factory preset for Thin Ethernet, unless otherwise noted at the time of order. The jumper pack is located in the socket marked "CHEAPERNET." If your network uses Thin Ethernet cabling, the EtherLAN SC is ready to be installed onto your network. If your network uses Thick Ethernet or Twisted-Pair Ethernet, move the jumper pack to the socket marked "ETHERNET."

EtherLAN SC-T

The EtherLAN SC-T is factory preset for Twisted-Pair Ethernet where the jumper pack is located in the socket marked "TWISTED PAIR." If your network uses Twisted-Pair Ethernet cabling, the EtherLAN SC-T is ready to be installed onto your network. If you plan on using the EtherLAN SC-T in a Thick Ethernet network, relocate the jumper pack to the socket marked "THICK." Refer to Appendix A for detailed instructions.

Connecting EtherLAN to the Macintosh

*Read these important notes before installation:*

- The EtherLAN has a built-in SCSI terminator and is designed to be the **last** device in the SCSI chain. If you cannot put the EtherLAN at the end of the SCSI chain, call FOCUS Technical Support before going any further with the installation.
- The cable which links the EtherLAN to the SCSI chain should not exceed two feet.
- The EtherLAN should not be placed against the side of the Macintosh where the power supply is located. (The RFI noise emitting from these Mac's power supplies may cause interference.)
- **NEVER** change any connections to the SCSI chain while any device, including the Macintosh, is powered on.

Before attaching the EtherLAN to the SCSI port of the Macintosh there are two items you need to check. First, make sure you have the correct cable for the installation and second, make sure the SCSI ID number is not in use by another device in the SCSI chain.

Connecting the EtherLAN Directly to the Macintosh

If you are connecting the EtherLAN directly to the back of the Macintosh, you simply require a two foot 25-pin to 25-pin cable. These cables are available at your dealer or through FOCUS Enhancements. This cable should have a "straight-through" pin configuration, and should not exceed two feet in length.

Connect one end of the cable directly the 25-pin SCSI connector on the back of the Macintosh. Connect the other end to the 25-pin connector on the back panel of EtherLAN. Make sure that the cable is completely seated on the Macintosh and on the EtherLAN and verify the securing screws firmly tightened.

25-pin SCSI Connector   Power Input   DB Connector (Thicknet)

BNC Connector (Thinnet)

SCSI Select Switch
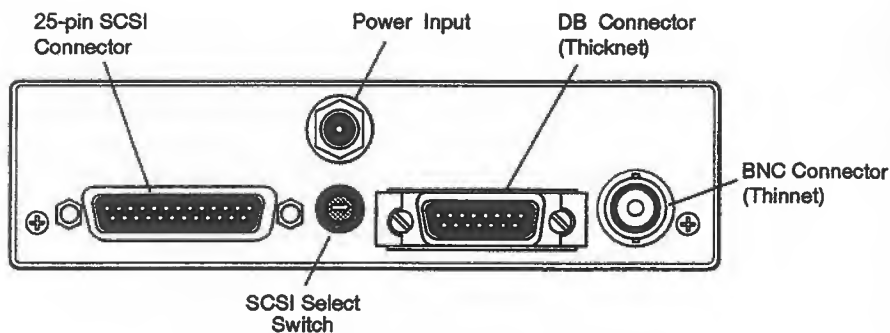
Connecting the EtherLAN to a 50-pin SCSI Device

Most SCSI devices have an external 50-pin SCSI connector designed for chaining with other SCSI devices. If this is the case then you will require a short (two foot) 50-pin to 25-pin cable to connect the EtherLAN to the SCSI chain.

At this time, check if the last SCSI device in the SCSI chain is terminated. If the SCSI device is terminated, remove its terminator. The EtherLAN, which has an internal terminator, will now be that last device on the SCSI chain. If the last device in the SCSI chain has an internal terminator, refer to vendor's documentation for instructions on how to remove the terminator.

Connect the 50-pin connector to the back of the SCSI device, then connect the 25-pin end to the EtherLAN. Make sure that the cable is completely seated on the SCSI device and on the EtherLAN and verify the securing screws and tabs are firmly tightened.

Checking the SCSI ID Number for Devices in the SCSI Chain

The EtherLAN SC is designed to act as the first device in your SCSI chain. A SCSI chain may contain up to eight devices connected together through the SCSI port of your Macintosh. Each of the devices in a SCSI chain must have a unique SCSI Identification Number (SCSI ID), from 0 through 6. (SCSI ID number 7 is reserved for the Macintosh.)

The EtherLAN's SCSI ID is preset at the factory to the number 4. If you are connecting the EtherLAN directly to the Macintosh, then you do not need change this. If this number is in conflict with the SCSI ID of another device in the SCSI chain, then you must change the EtherLAN SCSI ID number.

To determine the SCSI ID numbers currently in use, you can use the EtherLAN Setup program provided with your EtherLAN. Run the Setup program from your Macintosh floppy or hard drive. Under the "SCSI" menu select the command "Show SCSI IDs". This command displays a chart of all eight possible SCSI IDs. If a number is being used by a SCSI device, the words "In Use" will be displayed next to the number. If the SCSI ID number 4 is in use, you must change the EtherLAN SCSI ID in order to avoid conflict on your SCSI chain.

To change EtherLAN SCSI ID, turn off the Macintosh, the EtherLAN and all connected SCSI devices. Use a small screwdriver to turn the SCSI ID Dial on the back of the EtherLAN until it points to an unused SCSI ID number (from 0 through 6). Once the SCSI ID has been set, the EtherLAN is now ready to use.
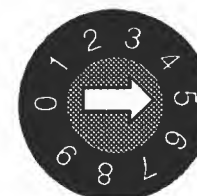
Connecting the Macintosh to Ethernet

Now that your EtherLAN is connected to your Macintosh or SCSI, you can connect your Macintosh to the Ethernet cable.

The Ethernet cable must be in place before you connect your Macintosh to the network. The Macintosh should be close to an Ethernet AUI transceiver or connector.

If you are installing a complete Ethernet network or if you do not know how to create a connector or transceiver location for your Macintosh, refer to the documentation supplied with the networking equipment or call FOCUS Technical Support.

You may connect your Macintosh to your network while the network is active. Network activity is not interrupted when you connect the Macintosh to T-connector or transceiver that is already installed on the Ethernet cable.

### Connecting to Thick Ethernet (EtherLAN SC and SC-T)

1. Turn off the Macintosh and disconnect the power cord from the EtherLAN.

2. Plug the male end of the 15-pin transceiver cable into the 15-pin transceiver connector on the back of EtherLAN. Secure the cable by sliding the locking guide into place.

From the EtherLAN SC
Transceiver
Thicknet Cable
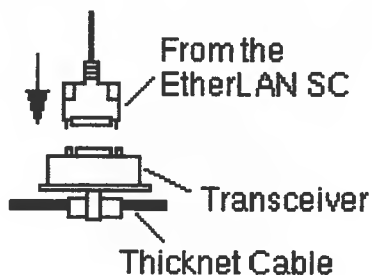
3. Insert the other end of the cable into the transceiver mounted on the Ethernet cable. Secure the cable by sliding the locking guide into place.

Connecting to Thin Wire Ethernet (EtherLAN SC only)

1. Turn off the Macintosh and disconnect the power cord from the EtherLAN.

2. Install the T-connector onto the BNC connector on the back panel of the EtherLAN SC. Twist the T-connector sleeve clockwise to lock the connector into place.

EtherLAN SC
Thin Ethernet Cable
BNC "T" Connector
Terminator (50 Ohms) (Required if at end of Thinnet Bus)
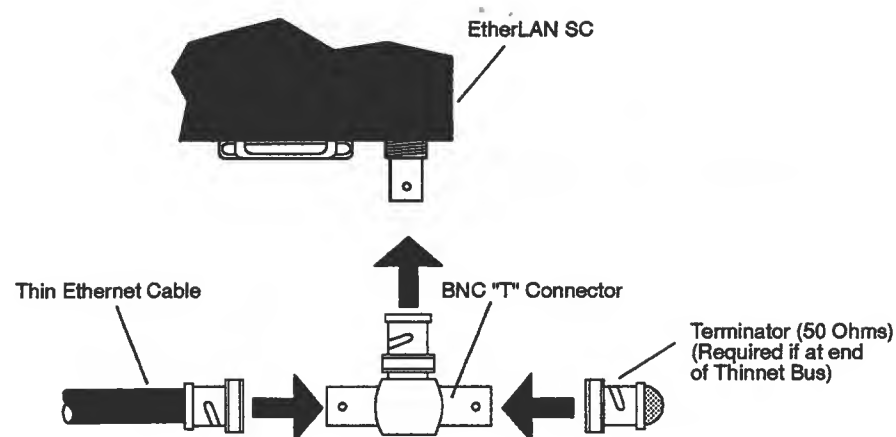
Check that the T-connector is attached to the Thin Ethernet cable. If your Macintosh is the last device on the Ethernet network, then one end of the T-connector attaches to the Thin Ethernet cable and the other end attaches to a 50 ohm terminator. This operation should be performed by your network administrator before connecting the T-connector to the EtherLAN SC.

CAUTION: Never insert any length of cable between the T-connector and the EtherLAN SC.

If you must disconnect the EtherLAN from the Thin Ethernet, remove the T-connector from the EtherLAN. Do not remove the network cables or terminator from the T-connector because this will disrupt the network.

Connecting to Twisted-Pair Ethernet (EtherLAN SC-T only)

1. Turn off the Macintosh and disconnect the power cord from the EtherLAN.

2. Insert one end of the 10BaseT cable into the RJ45 wall jack or 10BaseT Hub.

3. Insert the other end of the 10BaseT cable into the 8-pin RJ45 modular connector on the back of the EtherLAN SC-T.

8-pin Modular
Connector (10BaseT)

4-Wire Twisted Pair Cable connects
directly to Network Hub or via a wall jack.
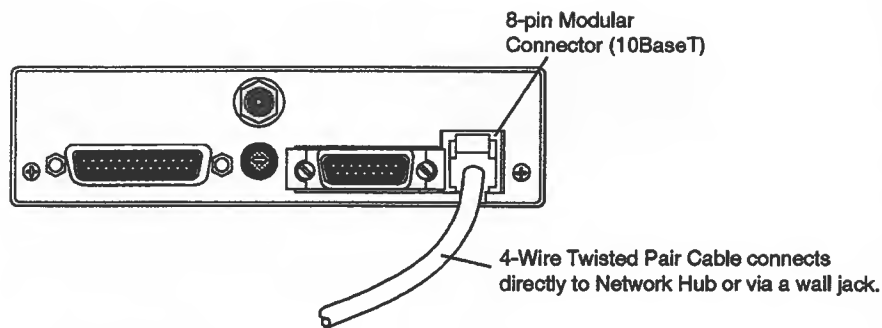
Connecting the EtherLAN Power Supply

Included with your EtherLAN is a standard 110 volt power supply. Attach the power supply to the power input jack located on the back of the EtherLAN, then connect the power supply to any 110 volt outlet.
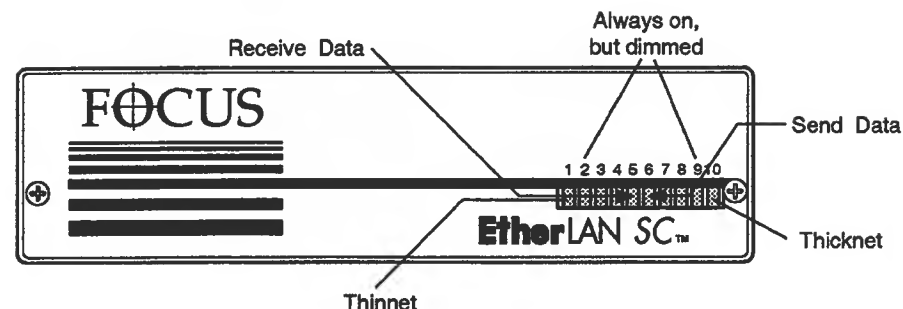
As with any SCSI device, turn on the EtherLAN before the Macintosh. The Macintosh checks for any SCSI devices at start up time. If the SCSI device is not powered on, the Macintosh will not recognize it and may have problems upon startup.
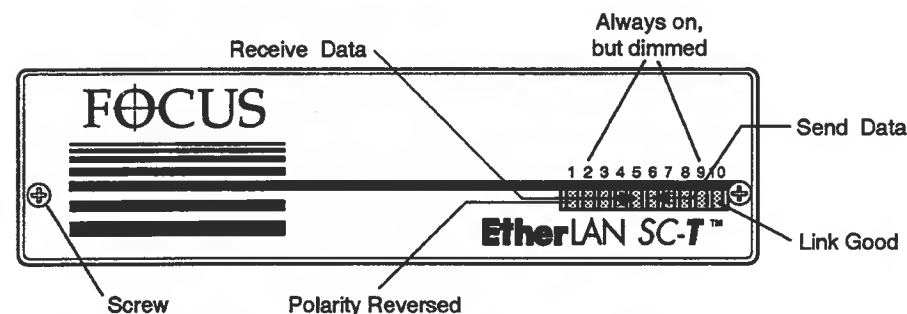
The EtherLAN Front Panel

The EtherLAN comes equipped with display lights (LEDs) on the right of the front panel. The EtherLAN display lights have different meanings depending upon the network activity. Below is a summary of the display light indicator.

After the EtherLAN is turned on, the display lights in either position 1 or position 10 illuminate to indicate the EtherLAN Ethernet configuration. This configuration light remains illuminated when the EtherLAN is on.

For the EtherLAN SC,
    position 1 is Thin Ethernet,
    position 10 is Thick Ethernet.

Receive Data
Always on, but dimmed
FOCUS
1 2 3 4 5 6 7 8 9 10
Send Data
EtherLAN SC™
Thicknet
Thinnet

For the EtherLAN SC-T,
    if the LED in position 1 is on, the polarity of the wires is reversed,
    if the LED is position 10 is on, then the link to the network is good.

Receive Data
Always on, but dimmed
FOCUS
1 2 3 4 5 6 7 8 9 10
Send Data
EtherLAN SC-T™
Link Good
Screw
Polarity Reversed

When data is received by the EtherLAN from the network, the LEDs 2 through 5 will flash in sequence from left to right. When data is sent through the EtherLAN to the network, LEDs 9 through 6 will flash in sequence from right to left. Of course, during normal network operations, both sending and receiving activity occur almost simultaneously. The EtherLAN display lights will appear to be converging from the outer lights to the inner lights. When LEDs 2 through 9 appear to be continuously illuminated, this typically indicates heavy network activity.

The EtherLAN hardware installation is now complete. Proceed to the Software Installation section to complete your Ethernet connection.

Software Installation

This section explains the basic steps to install the EtherLAN software. Before you install the EtherLAN software you should:

- Make sure you have the equipment you need. Refer to the Getting Started section at the beginning of this manual.
- Make a backup copy of the software disk included with the EtherLAN.
- Check the Macintosh system software. The EtherLAN requires System 6.0.3. and Finder 6.1 (or later versions).

Making a Backup Copy

To avoid losing the software contained on the EtherLAN disk, make a backup copy of the disk. You should store the original disk in a safe place and use your backup copy for the actual installation.

Checking the Macintosh System and Finder Version

Your Macintosh must be running System 6.0.3 and Finder 6.1 (or later versions) for the EtherLAN to function properly. You can upgrade your System and Finder using the latest Apple Installer disks available from your authorized Apple dealer. If you do not know which System and Finder your Macintosh is using, you can choose "About the Finder..." from the Apple menu; or select the System and Finder icons and use the "Get Info" option from the File menu.

If the System and Finder are earlier versions than what is required by your EtherLAN, you must upgrade your system software before installing the EtherLAN software. System 7 is recommended.

As a precaution, make a backup copy of your existing System Folder before installing the new system software.

*CAUTION: **Some hard disk drives require a custom installation program from the manufacturer to update the System and Finder. Do not use the Installer to update these hard disk drives. To determine if your hard disk needs a custom installer, check the documentation included with your hard disk.***

Installing the EtherLAN Software

Use a backup copy of the EtherLAN disk to install the EtherLAN software. Follow the procedures below:
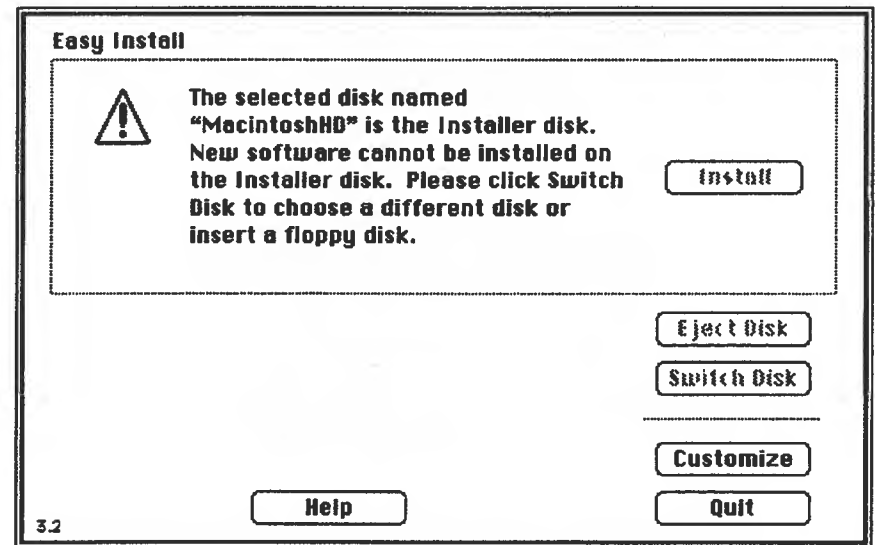
1. Start the Macintosh and insert the EtherLAN disk after boot-up.

2. Double-click on the Installer icon.

3. Click "OK" on the Welcome screen.

4. The next screen will present you with different options for installation. Select the hard disk using the Drive button.

5. Click the "Install" button.

6. Once the installation is complete, click the "Quit" button.

7. To install all the EtherLAN Setup program on your hard disk, drag the EtherLAN Setup program icon onto the hard disk from the EtherLAN disk.

Running the Macintosh over Ethernet

After the software is installed, restart the Macintosh from your regular startup disk. When the Macintosh has successfully restarted, your EtherLAN installation is complete. To use the Ethernet interface, perform the following steps:
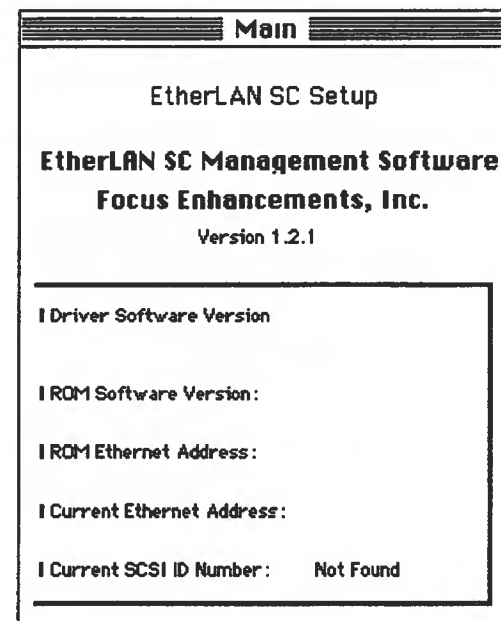
1. Disconnect from any network services currently in use. (E-Mail, File Servers, etc.)

2. Select the "Control Panel" under the Apple Menu.

3. In the Control Panel, scroll down the icon menu until you see the Network icon.

4. Select the Network icon and two icons will appear, one titled "Built-in" and another titled "EtherTalk." (Note: If you installed both versions of EtherTalk there will be two "EtherTalk" icons. The Phase 1 (V 1.2.2) icon only has single arrowhead. The Phase 2 (V 2.0.1) icon has double arrowheads.)

5. Select the appropriate "EtherTalk" icon and close the Control Panel. (Note: If you have not disconnected from a network service, the Macintosh will beep and warn you that your connection must be re-established. Click "OK," then reconnect to any servers or to the services you may have been using now that the Mac is using EtherTalk.)

6. Restart your Macintosh from your regular startup disk.

Your Macintosh is now ready to send and receive AppleTalk packets over the Ethernet network. With the EtherLAN providing the physical interface for Ethernet, your Macintosh can now take advantage of other third party software packages to communicate over Ethernet network. To test your installation, use the EtherLAN Setup program.

The EtherLAN Setup Program

The EtherLAN Setup program tracks information about the EtherLAN, the Macintosh, and the Ethernet network. The EtherLAN Setup program provides the following information and resources:

- Loopback testing of your Macintosh to EtherLAN connection
- Ethernet network statistics and errors
- SCSI statistics and errors
- SCSI chart of numbers in use

```
═══════════ Main ═══════════

        EtherLAN SC Setup

   EtherLAN SC Management Software
     Focus Enhancements, Inc.
           Version 1.2.1
  ┌─────────────────────────────────┐
  │ I Driver Software Version        │
  │                                  │
  │ I ROM Software Version :         │
  │                                  │
  │ I ROM Ethernet Address :         │
  │                                  │
  │ I Current Ethernet Address :     │
  │                                  │
  │ I Current SCSI ID Number :   Not Found │
  └─────────────────────────────────┘
```

Ethernet Menu

The EtherLAN compiles information about Ethernet Network Statistics and Errors. This information may be useful to your network administrator or to FOCUS Technical Support for troubleshooting purposes.

The EtherLAN can report statistics about the Ethernet network activity. These statistics are available to you through the Network Statistics option under the Ethernet menu.

The EtherLAN also tracks information about Ethernet errors. This information is available to you through the Networks Errors options.

SCSI Menu

The items under the SCSI menu provide information about the SCSI connection between the EtherLAN and the Macintosh.

The Show SCSI ID#'s option displays a chart of all the SCSI ID#'s currently in use. Devices that the program recognizes by name, such as the the EtherLAN and the Macintosh, will be displayed by name.

The processor in the EtherLAN also reports statistics about the SCSI activity and SCSI errors. These statistics are available to your through the SCSI Statistics and SCSI Errors options under the SCSI menu. These statistics may be useful to your network administrator or to FOCUS Technical Support.

Test Menu

The loopback Test option runs three tests to make sure the EtherLAN is sending receiving network packets correctly. The first checks on the EtherLAN's SCSI connection to the Macintosh and the related SCSI hardware in the EtherLAN. The second checks the internal operation of the EtherLAN. The third sends a packet out on the network to check the EtherLAN's Ethernet hardware and its connection to the network. To run all these loopback tests you must be connected to an Ethernet network. If you are not connected to the network, the tests will not provide accurate results.

Reset Statistics

This option will reset the error and statistics charts. Selecting this option will not alter your EtherLAN or affect any changes made during installation.

Troubleshooting Guide

If your EtherLAN is not operating properly, this portion of the manual may help you to find the source of the problem. Contact FOCUS Technical Support for assistance only after you have performed the following troubleshooting steps.

- Turn off your Macintosh, EtherLAN and all other SCSI devices.
- Check all connections to the EtherLAN.
- Check the Ethernet connection.
  Thick Ethernet
    Is the lock on the 15-pin connector slid securely into place?
  Thin Ethernet
    Is the BNC T- connector twisted securely onto the EtherLAN SC?
  Twisted-Pair Ethernet
    Is the modular connector crimped properly and are all of the wires intheir proper locations? Does the modular plug fit snugly into the modular outlet?
- Check the power connection to the EtherLAN and to the outlet. Is it seated properly?
- Check the SCSI cable connection. Is the cable securely attached?
- Turn on the SCSI devices and wait approximately 30-40 seconds for them to warm up, then, turn on the Macintosh. Did the proper LED's on the EtherLAN illuminate?
- No. The device is not getting power. Check your connections and try a different outlet.
- Yes. Continue troubleshooting....

For the EtherLAN SC-T: Is the LED in position 1 or 10 lit?

- Yes, LED #1 is lit. This indicates that the polarity of the wires in the modular connector is switched.

- Yes, LED #10 is lit. This indicates a failure of the Link Test. Call FOCUS Technical Support.

- No. Continue Troubleshooting....
  Did the LEDs complete their flashing sequence?

- No. This is a possible hardware problem. Make sure the connections to the network are secure (BNC connector, transceiver, or twisted pair wiring) and replace any external transceivers to rule out a hardware problem outside of the EtherLAN. If the problem continues, call FOCUS Technical Support.

- Yes. Continue troubleshooting...
  Upon startup, does the Macintosh get past the disk icon with the flashing question mark?

- No. You may have two SCSI devices set to the same SCSI ID number. Disconnect the EtherLAN from the Macintosh, and start the Macintosh. Open the EtherLAN Setup program, and select "Show SCSI IDs" from under the SCSI menu. Check the SCSI Address Dial on the back of the EtherLAN and make sure the number selected is not the number 7 and is not in use by another device. To change the SCSI ID number, turn off the EtherLAN. Use a small screwdriver to turn the SCSI Address dial until it points to an unused number less than 7.

- Yes. Continue troubleshooting...
  Does the Macintosh stop during the startup process?

- Yes. There appears to be a software problem. Restart the Macintosh. Open the EtherLAN Installer program and install the EtherLAN software again with Extension turned off in Sytsem 7, or INITs hidden or disabled in System 6. (You will also want to update the System software.)

- No. The Macintosh completes the startup process. Continue troubleshooting...

Open the EtherLAN Setup program and run the "Loopback Test" feature.
Did all three tests pass?

- No. Which test did it fail?

1) Network Interface Controller - This test checks circuits on the EtherLAN. If this test fails, there may be a connection problem between the EtherLAN and the Mac or it could be a hardware problem. Check all the connections to the EtherLAN and try this test again.

2) Serial Network Interface - This test checks other circuits on the EtherLAN. If this test fails, there may be a problem with the hardware. Check all connections to the EtherLAN and try this test again.

3) Thin Ethernet transceiver or MAU - This test checks the internal Thin Ethernet transceiver chip to make sure that it can send and receive packets. If you are using Thin Ethernet and this test fails, a hardware error may have occurred in the chip, or there may be a bad connection to the Thin Ethernet backbone. If you are running Thick Ethernet, or Ethernet over Twisted-Pair, there may be a problem with the external transceiver.

NOTE: *The results from this test will not be accurate if the EtherLAN is not connected to a network. This includes a defective connector (bad BNC, Transceiver cable or badly crimped RJ45 plug).*

Move the EtherLAN to a known working location or replace existing hardware with new hardware to eliminate the possibility of a bad connection to the network.

- Yes. The EtherLAN passed all three tests. Reinstall your network software (i.e., AppleShare, LaserWriter and LaserWriter Prep files, etc.). Try this test again.

If the preceding steps do not solve the problem, contact FOCUS Technical Support at the numbers or addresses listed below:

FOCUS Enhancements, Inc.
800 West Cummings Park
Woburn, MA 01801
(617) 938-8088

Technical Support	(800) 647-7744
Sales Support	(800) 538-8866
FAX	(617) 938-7741
AppleLink	FOCUS
CompuServe	776640,2422
America Online (AOL)	Focus Tech
Internet	focus@applelink.apple.com

Appendix A

Changing the EtherLAN's Ethernet Configuration

The EtherLAN SC is pre-configured for Thin Ethernet (unless otherwise specified at the time of order). The EtherLAN SC-T is pre-configured for Twisted-Pair Ethernet. You can use the thicknet connector (with an AUI transceiver) to use the "opposite" Ethernet media. To do this you need to move a simple jumper on the EtherLAN board. The instructions below explain how to:

- Open the EtherLAN to expose the inside components.
- Locate the two jumper sockets which specify the cable configuration for the EtherLAN.
- Identify the correct jumper socket for your Ethernet cable.
- Move the jumper pack to the correct socket.

Your EtherLAN should be reconfigured by an individual who is experienced in handling electronic components. Take the proper precautions to provide an anti-static environment for this operation. FOCUS Enhancements, Inc. will not be responsible for components that are damaged due to the negligence of the person performing this operation.

Tool Requirements

- 1 small needle-nose pliers
- 1 small, Phillips screwdriver (#1 point)

Opening the EtherLAN

Before continuing with this procedure, verify that the proper precautions have been taken to ensure the EtherLAN will be safe from electrostatic discharge while it is open.

1. Unplug the EtherLAN power supply, turn off the Macintosh and all SCSI devices attached to the SCSI chain.

2. Disconnect all cables attached to the EtherLAN including the SCSI cable and any network cables.

3. Remove the two screws located on the front panel.

4. Remove the front panel and slide the cover off the EtherLAN.

Locating the jumper sockets and reconfiguring the EtherLAN

Position the unit on a table in front of you so that the back panel end is facing you. The jumper is located on the base board, directly behind the rotary switch.

After locating the jumper, you will notice the two pins sticking up out of the board. To configure your unit for thin (or twisted-pair) the jumper should be over both pins. For thick Ethernet either remove this jumper altogether or place it over just one of the pins. (The latter is recommended so that you know where the jumper is if you need to change back later.)

In order to remove the jumper from its present position, carefully lift it off of the pin(s) using the small needle-nose pliers.

To reinstall the jumper, first align the jumper over the pin(s). Then, carefully apply downward pressure until the jumper covers the pin(s) completely.

Appendix B

10BaseT Wiring Specifications

10BaseT is much different than other telephone-wire networks. For any 10BaseT network with more than two devices, a multi-port repeater, or hub, is necessary. Each port of this hub can only have a single device connected to it.

The wires which radiate from the hub to each device have a very specific wiring configuration. The wiring configuration for the two pairs (4 wires) used in 10BaseT is as follows:

10BaseT Patch Cord

To device		To hub	
Pin	Function	Pin	Function
1	Transmit +	3	Receive+
2	Transmit -	6	Receive -
3	Receive +	1	Transmit +
4	(unused)	4	(unused)
5	(unused)	5	(unused)
6	Receive -	2	Transmit -
7	(unused)	7	(unused)
8	(unused)	8	(unused)

It is important to use the appropriate wiring for reliable data transfer. 10BaseT wiring should adhere to the following requirements:

- 2 Pairs
- 24 Gauge
- Unshielded
- Twisted pair
- Maximum length from node to repeater or hub is 100 meters.

Appendix C

Limited Warranty

FOCUS Enhancements warrants the EtherLAN against defects in materials and workmanship for the period of five years from the date of original purchase. In the unlikely event of a defect in material or workmanship, FOCUS Enhancements will, at its option, repair, replace, credit or refund the purchase price of the EtherLAN provided you return the defective product per the instructions given to you by the Technical Support Specialist when you request a Return Merchandise Authorization number. All implied warranties are limited in duration of five years from the date of original retail purchase of the EtherLAN. This warranty is exclusive of all other warranties written, expressed or implied.

Except as specifically provided above, FOCUS Enhancements makes no warranty or representation, either express or implied, with respect to this hardware, software or associated documentation, including their quality, performance, merchantability or fitness for a particular purpose for a term longer than five years.

In no event will FOCUS Enhancements be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of or inability to use the hardware, software or documentation, even if advised of the possibility of such damages. In particular, FOCUS Enhancements is not responsible for any costs including but limited to, those incurred as result of lost profits or revenue, loss of use of the software, loss of data, the cost of recovering such software or data, the cost of substitute hardware or software, or claims by third parties. FOCUS Enhancements is not responsible for the safety, quality or integrity of the cabling in your network and will not be responsible for any result of improper installation of EtherLAN SC or EtherLAN SC-T. FOCUS Enhancements is not responsible for the safety, quality or integrity of the cabling in your network and will not be responsible for any result of improper installation of EtherLAN SC or EtherLAN SC-T. FOCUS Enhancements is not responsible for incidental damage caused to persons, data or equipment resulting from extraordinary circumstance (e.g. natural disasters) or improper installation of EtherLAN SC or EtherLAN SC-T. In no case shall FOCUS Enhancements' liability exceed the amount of the purchase price.

The warranty and remedies set forth are exclusive and in lieu of all others, oral or written, express or implied No FOCUS Enhancements dealer, distributor, agent or employees is authorized to make any modification or addition to this warranty.

Some states do not allow the exclusion or limitation of implied warranties or limitation of liability for incidental or consequential damages, so the above limitations or exclusion may not apply to you.

Product Return Policy

Prior to shipping any product to FOCUS Enhancements for any reason, you must contact FOCUS Technical Support (by mail, FAX, telephone or computer) with the following information: (a) the problem (b) the reason for return (c) quantity, description, model number and serial number of each item being returned, and (d) any special instructions. If the Technical Support Specialist determines that there is a hardware problem, he/she will issue an RMA (Return Merchandise Authorization) number and specific instructions to ensure prompt and accurate processing.

An RMA number must be obtained by the customer before the product is returned to FOCUS Enhancements. Any product shipped to FOCUS Enhancements without a valid RMA number clearly marked on the package will be refused. FOCUS Enhancements shall not be responsible for shipping costs to FOCUS Enhancements. However, FOCUS Enhancements will pay for the return of repaired merchandise to the customer provided that the customer is located in North America and the product was not damaged by the customer.

EtherLAN SC/EtherLAN SC-T Technical Specifications

Size:
Enclosure 5.5 x 1.5 x 7.5 inches. No Fan.

Connections:
25-pin SCSI port
BNC Connector to IEEE 802.3 10Base2 Thin Ethernet
(EtherLAN SC only)
DA15S Connector to IEEE 802.3 10Base5 MAU interface,
Thick Ethernet 8-pin
modular connector to IEEE 802.3 10BaseT MAU interface,
Twisted-Pair
Ethernet (EtherLAN SC-T only)

Power Supply:
12 V a.c., 50 Hz or 60 Hz @1.67 A=20 VA or 12 V d.c. @ 1.67 A
Power Connector = Switchcraft S760 plug

Main Components:

Ethernet controller	8390
SCSI Interface	5380
Processor	10 MHz, 80188
RAM	32 Kbytes, static,100 ns
EPROM	32 Kbytes, 200 ns

Brief Description of EtherLAN SC/SC-T Setup Statistics

NOTE: *As detailed below, a number of error tallies can occur when EtherLAN SC is powered up on an active network and its host Macintosh has been shut down. To get accurate information it is usually a good idea to reset the statistics using EtherLAN SC/SC-T Setup before you attempt to recreate a problem and then collect fresh statistics.*

Network Statistics

Receives: Packet received by the Ethernet Network Interface Chip (NIC) and stored in the EtherLAN SC on-board receive buffer.

Transmits: Packet successfully transmitted by the NIC.

Transmit Requests: Packet put in the EtherLAN SC on-board transmit buffer and NIC set to transmit.

Resets: NIC was reset. This typically happens after a NIC receive buffer overflow.

Network Errors

CRC Error: The packet received did not match the packet transmitted. Packet dropped. A large number of these errors per the number of packets received usually points to a cabling problem.

Frame Error: The incoming packet did not end on a byte boundary. A large number of these errors points to a network hardware or cabling problem.

Missed Packets:	A packet couldn't be received because the receive buffer ring was full. This error occurs often when EtherLAN SC is on but the Macintosh is off.
unexp_rst:	A reset interrupt occurred on the NIC. This error often occurs when EtherLAN SC is on and the Macintosh is off.
re_int:	A receive error occurred. Typically a CRC or Frame Error.
te_int:	A transmit error occurred. Typically too many collisions trying to transmit a packet.
ow_int:	The receive buffer ring was full when a packet arrived. This error often occurs when EtherLAN SC is on and the Macintosh is off.
cntovflw_int:	The NIC signaled that its error counters needed to be read. Not really an error.
dma_int:	Not used in EtherLAN SC.
txto_in:	A transmit was attempted during a SCSI reconnect, but no NIC interrupt occurred to signal completion.
txto_wrt:	A transmit was attempted during a SCSI write, but no NIC interrupt occurred to signal completion.
txon_ovflw:	A transmit was requested while the NIC receive buffer was full.
txin_ovflw:	A SCSI reconnect transmit was requested while the NIC receive buffer was full.
txwrt_ovflw:	A SCSI write transmit was requested while the NIC receive buffer was full.

SCSI Statistics

scsi_int:	The SCSI chip signaled to interrupt the processor.
select:	The EtherLAN SC box received a SCSI select signal.
reset:	The SCSI chip was cleaned up at the end of a SCSI operation.
cmmd_ethwrt:	The Macintosh gave EtherLAN SC an Ethernet packet to send using a SCSI write.
bus_busy:	The SCSI bus was busy when EtherLAN SC wanted to reconnect.
arbitrate:	The bus was not busy and EtherLAN SC performed a SCSI arbitration.
reconnects:	EtherLAN SC successfully reconnected with the Macintosh.
recon_rcvs:	A received Ethernet packet was transferred to the Macintosh during a reconnect.
recon_sends:	The Macintosh gave EtherLAN SC and Ethernet packet to send during reconnect.
discon_pre:	Before accepting any received packets, the Macintosh asked EtherLAN SC to get off the bus to allow operations with another SCSI peripheral.
dicon_post:	After accepting one or more received packets, the Macintosh asked EtherLAN SC to get off the bus to allow operations with another SCSI peripheral.
discon_sel:	After asking EtherLAN SC to get off the bus, the Macintosh reselected it.

no_busfree:	The bus did not go free while EtherLAN SC was waiting to arbitrate.
lost_arb:	Another device won arbitration while EtherLAN SC was trying to arbitrate.
toss_packet:	The Macintosh instructed EtherLAN SC to discard a packet because the header showed that its protocol type didn't match any active protocol handlers.
recon_ok:	The Macintosh gave a SCSI message to EtherLAN SC telling it that reconnects are allowed.
cmmd_ethrst:	An Ether reset command was received.
cmmd_sndmsg:	A send message command was received.
cmmd_getmsg:	A get message command was received.
cmmd_inq:	An inquiry command was received.
cmmd_rqsens:	A request sense command was received.
cmmd_tstrdy:	A test ready command was received.
cmmd_mdsens:	A mode sense command was received.
cmmd_dummy:	An unimplemented command was received.
cmmd_rdiag:	A receive diagnostics command was received.
cmmd_sdiag:	A send diagnostics command was received.
cmmd_addr:	A command was received to set the Ethernet address.
cmmd_mcast:	A command was received to set the multicast address.

mess_out:	The Macintosh sent us a SCSI message.
gotbus_rst:	A SCSI bus reset occurred.
set_up:	The SCSI chip was restarted. Typically this occurs due to a bus reset.
setbus_rst:	This tally is not used.

SCSI Errors

parity:	A parity error was detected on the SCSI bus. EtherLAN SC is designed to detect and recover from this type of error.
multiple_ids:	During a SCSI select sequence, EtherLAN SC detected too many SCSI ID bits on the bus. This could mean another device violated the SCSI protocol.
cmmd_err1:	A timeout occurred waiting for the first byte of a SCSI command, after a successful selection sequence.
cmmd_unknwn:	An unknown command type was sent to EtherLAN SC. EtherLAN SC will abort and wait for another selection.
cmmd_err2:	A timeout occurred waiting for the second or later byte of a SCSI command, after a successful selection sequence and a good first byte.
cdms_to1:	A command or message in sequence timed out at the beginning.
cdms_to2:	A command or message in sequence timed out during the transfer.
cdms_to3:	A command or message in sequence timed out at the end.

status_err:	A timeout occurred sending the SCSI status, after a successful selection sequence, and command sequence.
stms_to1:	A status or message out sequence timed out at the beginning.
stms_to2:	A status or message out sequence timed out during the transfer.
stms_to3:	A status or message out sequence timed out at the end.
no_initresp:	The Macintosh did not respond to a SCSI reconnection select. This happens often if the Macintosh has been turned off and EtherLAN SC has been left on.
mssg_pre1:	An error occurred during a reconnection message phase, before any packets had been transferred.
mssg_pre2:	An error occurred during a reconnection message phase, before any packets had been transferred.
unkwnmsg_pre:	An unknown message type was received during a reconnection message phase, before any packets had been transferred.
mssg_post1:	An error occurred during a reconnection message phase, after one or more packets had been transferred.
mssg_post2:	An error occurred during a reconnection message phase, after one or more packets had been transferred.

unkwnmsg_post:	An unknown message type was received during a reconnection message phase, after one or more packets had been transferred.
xmit_badlen:	A request was received to transmit an Ethernet package larger than 2K bytes in size.
Out_DMAto1:	A timeout occurred while using DMA to transfer information to the Macintosh.
Out_DMAto2:	A timeout occurred while using DMA to transfer information to the Macintosh.
Out_DMAto3:	A timeout occurred while using DMA to transfer information to the Macintosh.
In_DMAto1:	A timeout occurred while using DMA to transfer information from the Macintosh.
In_DMAto2:	A timeout occurred while using DMA to transfer information from the Macintosh.
no_maccon:	The Macintosh never connected with another device after asking EtherLAN to get off the SCSI bus.
ether_out:	An error occurred during a reconnection sequence.
mssg_finish:	An error occurred during the message phase at the end of a SCSI command.

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